CHAPTER 3

OPTIMIZATION OF AGGREGATE GRADATIONS AND PERMEABILITY TESTS OF MIXTURES

The permeability of the asphalt mixtures depends not only on the total void content but also on the size and continuity of the voids. The aggregate gradation plays an important role in determining the size and continuity of the voids. To control the permeability of the mixtures, the aggregate gradations can be modified. This chapter deals with the optimization of the aggregate gradations for a required level of permeability.

3.1 Bailey Method of Gradation Analysis

Changing the aggregate gradation of a mixture alters the particle size distribution which in turn influences the amount of space in the aggregate skeleton. The Bailey Method of Gradation Analysis can be used for optimizing aggregate gradations. The Bailey method primarily deals with the estimation/measurement of aggregate interlock for required rut resistance using a regression relationship between VMA and packing coefficients. The methodology of the Bailey Method of Gradation Analysis takes into consideration the packing characteristics of individual aggregates and provides quantified criteria that can be used to adjust the packing characteristics of a blend of materials (17). The Bailey Method involves the following approach:

- Evaluates packing of coarse and fine aggregates individually
- Contains a definition for coarse and fine aggregate
- Evaluates the ratio of different size particles
- Evaluates the individual aggregates and the combined blend by volume